3. Reference Information

3-1 Abbreviations and Acronyms

Tables 3-1-1 and 3-1-2 list abbreviations and acronyms which may be found in this service manual.

Abbreviations

Abbr	Definition	Abbr	Definition
amps	amperes	motor_pa	Motor phase A
ass'y	assembly	motor_pb	Motor phase B
badac	bad access	mpx	multiplex
bps	bits per second	neg	negative
CBUSY	Command busy	od	open drain
CCLK	Command clock	OSC	oscillator
clk	clock	OUT	output
cm	centimeter(s)	pba	printed board assembly
CMSG	Command message	pcb	printed circuit board
CON	connector	pix	picture
DS	Data Strobe	Pmotor	LSU motor on
EBUSY	Engine Status busy	pos	positive or position
EMSG	Engine Status message	pot	potential
Exitpap	Exit paper	ppm	print pages per minute
GND	ground	PRINT	Print command
HLDA	hold acknowledge	psync	page synchronization
hldar	hold acknowledge received	pwr	power
HLDR	hold request	Q_Lamp	Quenching Lamp
HOR	horizontal	qty	quantity
HSYNC	Horizontal sync	READY	Engine print ready
I/O	Input and Output	sw	switch
in	inch(es) or input	tach	tachometer
INT	Interrupt	thvea	Transfer high voltage Enable
INTA	Interrupt Acknowledge	Vcc	collector supply voltage (dc)
INTR	Interrupt Request	VDI	Video data from controller
lb.	Pound(s)	VDO	Video data output
LDON	laser Diode On	vert	vertical
lin	linearit	Vp-p	peak-to-peak voltage
lock	bus lock	VR	variable resistor
Lready	LSU power ready	mm	millimeter(s)

Acronyms

Acronym	Definition	Acronym	Definition
ADC	Analog to Digital Converter	LED	Light Emitting Diode
ALE	Address-Latch Enable	LSU	Laser Scanner Unit
ASCII	American Standard Code for	MHV	Main High Voltage
	Information Interchange	MPU	Micro Processor Unit
BIOS	Basic Input/Output System	NC	No Connection
BPS	Bits Per Second	PCB	Printed Circuit Board
CMOS	Complementary Metal Oxide	PCU	Printed Control Unit
	Semiconductor	PLCC	Plastic Leaded Chip Carrier
CPU	Central Processing Unit	PPM	Page Per Minute
DCU	Diagnostic Control Unit	PQFP	Plastic Quad Flat Package
DMA	Direct Memory Access or	PWM	Pulse Width Modulation
	Dynamic Memory Access	QFP	Quad Flat Package
DMAC	Direct Memory Access Controller	RAM	Random Access Memory
		ROM	Read Only Memory
DOS	Disk Operating System	SCC	Serial Communications Controller
DPI	Dots Per Inch (resolution)		
DRAM	Dynamic Random Access Memory	SMPS	Switching Mode Power Supply
DVM	Digital Voltmeter	SOP	Small Outline Package
EEPROM	Electronically Erasable	THV	Transfer High Voltage
	Programmable Read Only Memory	TS	Tri-State
ICU	Image Control Unit	VCU	Video Control Unit

3-2 Chip Replacement (SMD)

3-2-1 Precautions for Chip Replacement

1. Do not directly touch any portion of the part with the soldering iron. ICs, especially TSOPs, are easily damaged by heat.

2. Use care with the soldering iron tip and avoid rapidly heating parts. Some parts can be damaged by sudden heating. Preheat the part at about 100°C for several minutes before installing it.

3. Use a soldering tip temperature of about 240°C. For larger parts, use a slightly higher temperature (about 280°C).

4. The thin (0.3mm) solder for miniature parts does not contain adequate flux. Supplementary flux is thus needed in most cases.

   Computer, OA and A/V systems are manufactured using flux which can be cleaned by water. When you replace the part or when troubleshooting, use proper flux and solder which can be cleaned by water.
   Improper flux may cause the soldering area to corrode and may cause a fatal system error.

5. Use care not to damage the circuit pattern, especially when desoldering. Because of the many pins, cleanliness of the pattern is extremely important after removing an IC.

6. Use care to avoid solder bridges. Remove any bridges that occur.

7. Position the part carefully. This also affects the soldering operation. Be very precise in positioning the IC. Soldering opposite pins first holds the IC in place and makes soldering the other pins easier.

8. Do not reuse removed parts.

9. Clock for solder joints, especially miniature parts with small lead.

10. A defective trimming resistor cannot be adjusted externally. Replace with an ordinary variable resistor.

11. Always inspect the work with a magnifying lens. Check after installing cold solder joints, etc.

3-2-2 Tools for Chip Replacement

The tools for chip replacement are as follows:

· Thin tip type soldering iron.
· Small flat-blade tip type soldering iron
· Special desoldering tip iron
· Air-blower Unit
· Flat Package Pick-up
· Flux that can be cleaned by water
· 0.3mm thin solder that can be cleaned by water
· Desoldering wire
· Tweezers

3-2-3 Chip Resistor and Chip Capacitors

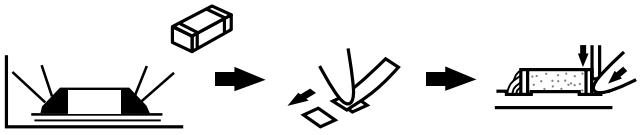
TYPES

The types of chip resistors and chip capacitor are as follows:

· Thick Film Chip Resistors
· Carbon Film Chip Resisters
· Metal Film Chip Resisters
· Chip Ceramic Capacitors
· Chip Trimming Resisters

REMOVING

1. Using Two soldering irons:
   a. Use thin tip soldering irons
   b. Use soldering tip temperature of about 280°C.
   c. Simultaneously heat both ends of the part.
   d. While heating, grasp the part with the tips of the soldering irons and remove it.
   e. Use desoldering wire to completely remove the old solder from the part location on the board. A clean pattern for installing the new part is very important.



INSTALLING

1. Clean the area where the new part is to be mounted.
2. Apply a water soluble flux.
3. Set part correctly into position and prevent is from shifting.
4. Bring the soldering iron tip close to the part contact without actually touching it. Melt thin (0.3mm) solder between the tip and part so that it flows into the part contact.
5. Check work quality with a magnifying lens.

3-2-4 Chip Tantalum Capacitors and Chip filters

TYPES

The types of chip tantalum capacitors and chip filters are as follows:

· Chip Inductors

· Chip Tantalum Capacitors

· Chip Tantalum Electrolytic Capacitors

· Chip Aluminum Electrolytic Capacitors

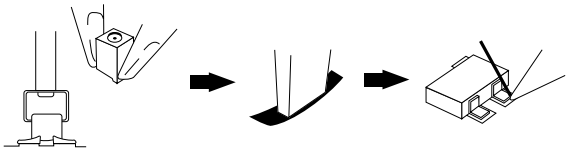
· Chip Transformers

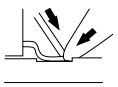
· Chip Filters

REMOVING

1. Using a special desoldering iron:
   a. Select soldering tip according to part size.
   b. Bring the tip into contact with the solder points.
   c. When the solder melts, remove the part.
   d. Remove the old solder with desoldering wire.

2. Using a special desoldering iron:
   a. Use small flat-blade tips.
   b. Heat both ends of the part simultaneously.
   c. When the solder melts, grasp and remove the part with the soldering iron tips.
   d. Remove the old solder with desoldering wire.





INSTALLING

1. Clean the area where the new part is to be mounted.
2. Apply a water soluble flux.
3. Set part correctly into position and prevent it from shifting.
4. Use a sharp soldering iron tip. Bring the tip close to the part contact without actually touching it. Melt thin (0.3mm) solder between the tip and part so that it flows into the part contact.
5. Check work quality with a magnifying lens.

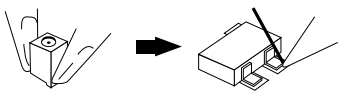
3-2-5 Chip VRs, Chip Trimmer Capacitors, Diode and Tr.

TYPES

The types of parts are as follows:
· Chip VRs
· Chip Trimmer Capacitors
· Diode
· Transistors

REMOVING

1. Using two soldering irons.
   a. Use small-flat-blade tips.
   b. Heat the leads of the part simultaneously.
   c. When the solder melts, grasp and remove the part with the soldering iron tips.
   d. Remove the old solder with desoldering wire.



INSTALLING

1. Clean the area where the new part is to be mounted.

2. Apply a water soluble flux.

3. Set part correctly into position and prevent is from shifting.

4. Use a sharp soldering iron tip. Bring close to the part contact without actually touching it. Melt thin (0.3mm) solder between the tip and part so that it flows into the part contact.

3-2-6 Chip ICs

TYPES

The types of chip ICs are as follows:

1. SOP (Small Outline Package) IC
2. SSOP (Shrink Small Outline Package) IC
3. VSOP (Very Small Outline Package) IC
4. QFP (Quad Flat Package) IC
5. VQFP (Very Quad Flat Package) IC
6. PLCC (Plastic Leaded Chip Carrier) IC
7. TSOP (Thin Small Outline Package) IC

REMOVING

1. Using special desoldering iron:
   a. Select the tip according to the size shape of the IC.

   b."Tin" the tip with a small amount of the IC leads.
   c. Set the tip squarely over the IC leads.
   d. When the solder melts, carefully twist the iron.
   e. Raise and remove the IC.

2. Using a shaped air-blower unit:
   a. Select the correct nozzle.
   b. Select the temperature and air-blow (suggested : temperature : 7, air-blow:4)
   c. Engage the IC removing tool.
   d. Use the air-blow the preheat the IC for about 5 seconds, then heat with the nozzle until the IC remove lifts the part from the board.

INSTALLING

1. Use desoldering wire to remove the previous solder

2. Clean the location.

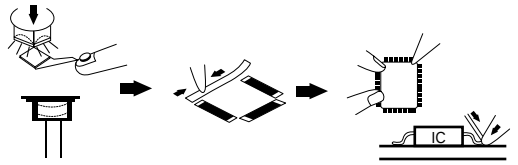
3. Apply water soluble flux.

4. Position the IC and solder two pins at opposite sides.

5. Use a sharp tipped soldering iron and carefully solder each pin. (After gaining experience, a thicker tip can be used for better work efficiency)

6. Remove any solder bridges with desoldering wire.

7. Inspect the work with a magnifying lens.



3-3 Recommended Test Equipment

Samsung recommends the following equipment when servicing the Laser Printer.

Digital Multimeter	A digital multimeter with attached LED or LCD 4-digit Panel
Oscilloscope	A digitizing oscilloscope which can measure more than 100MHz
High Voltage Probe	A high voltage probe which can measure about less than 10KV
DCU (Diagnostic Control Unit)	DCU can be supplied from Samsung which can easily shows the engine's error status

Table 3-4-1 Equipment List

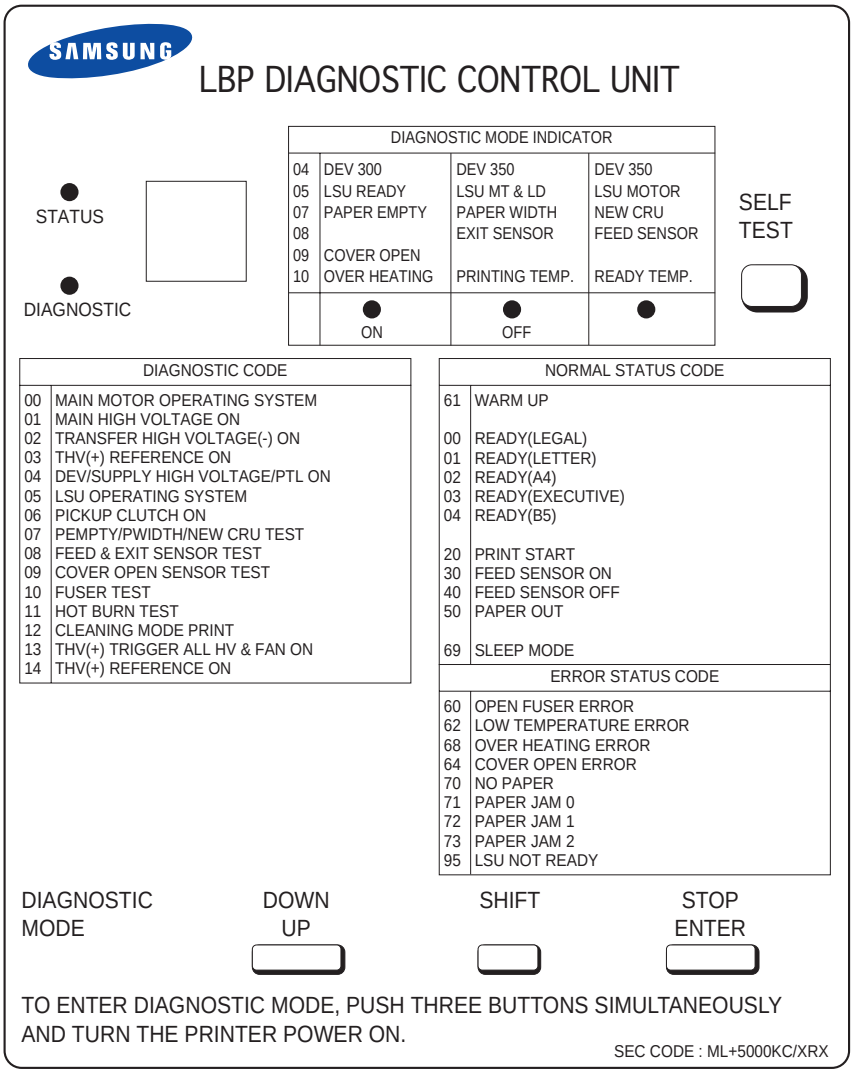


Figure 3-4-1 DCU

3-4 DCU Control

3-4-1 DCU Setup

1) Connect DCU to Controller Board Connector J6 (4 pins) or Engine Board CN2 (4pins).
2) To apply power, simultaneously press and hold down [DOWN], [SHIFT], and [STOP] keys. '78' is displayed.
3) After 2-3 seconds, release the keys. '00' is displayed.
4) Press [UP] or [SHIFT]+[DOWN] keys until the desired code number is displayed in the DCU display.
5) Press [ENTER] to begin operating.
6) Example : Select numbers '13' and '14' to adjust the electrophotography trigger voltage.
7) To end operation, press [SHIFT] and [STOP] keys.

3-4-2 DCU Diagnostic Mode

The DCU is used to diagnose the printer malfunction status.

Display	Diagnostic Code Description
00	MAIN MOTOR OPERATING SYSTEM
01	MAIN HIGH VOLTAGE ON
02	TRANSFER HIGH VOLTAGE(-) ON
03	THV(+) REFERENCE ON
04	DEV/SUPPLY HIGH VOLTAGE/PTL ON
05	LSU OPERATING SYSTEM
06	PICKUP CLUTCH ON
07	PEMPTY/PWIDTH/NEW CRU TEST
08	FEED & EXIT SENSOR TEST
09	COVER OPEN SENSOR TEST
10	FUSER TEST
11	HOT BURN TEST
12	CLEANING MODE PRINT
13	THV(+) TRIGGER ALL HV & FAN ON
14	THV(+) REFERENCE ON

3-4-3 DCU Error Status Code

DCU error code will indicate malfunction area of the machine.

Display	Error status
60	OPEN FUSER ERROR
62	LOW TEMPERATURE ERROR
68	OVER HEATING ERROR
64	COVER OPEN ERROR
70	NO PAPER
71	PAPER JAM 0
72	PAPER JAM 1
73	PAPER JAM 2
95	LSU NOT READY

3-4-4 Error Solution

Display	Solution
60, 62, 68	1. Measure the resistance of the AC connector on the Fuser. Normal resistance is 2-4 ohmsfor 110V, 6-8 ohms for 220V. 2. Check if the fuser lamp works properly. 3. Measure the resistance at Q101 on the engine board. If abnormal, replace Q101, Q3, PC151, Q8.
70	1. Make sure that paper is loaded in the cassette. 2. Replace OP2 sensor (photo interrapter). 3. Check if the feed clutch works properly. 4. If abnormal, replace the feed clutch or Q4 on the engine board.
71	1. Make sure that paper is loaded in the cassette. 2. Check for pick-up unit. If it is heavily worn, replace it with new one. 3. Replace OP1 sensor.
72, 73	1. Make sure that the paper being used meets the specification. 2. Check if there is a paper jam in the fuser. 3. Replace OP1, OP3 on the engine board. 4. Check the fuser roller for any dirt. If dirty, clean the roller.
95	1. Check for U205 on the engine board. 2. Replace LSU. 3. Measure the resistance at R62 and R8. If abnormal, replace them.